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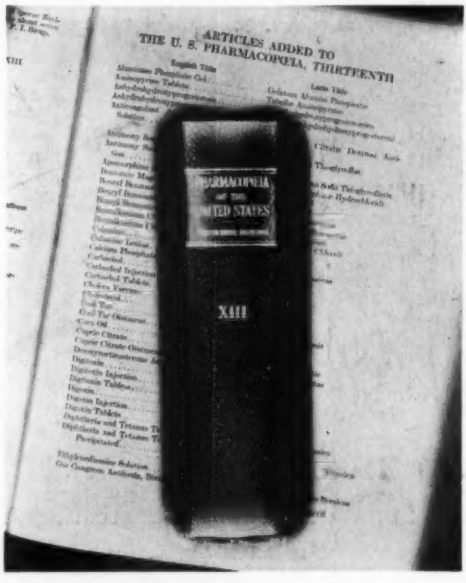

See article "The New Drugs of the U. S. P. XIII" for complete review

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the trend of the times

In the modern airplane there is a touch of tomorrow which is vitally significant of the trend of the times. Railroads, along with the automotive industry, have also made great progress. The tempo is fast and change is the order of the day. The business of living must have been somewhat difficult when the horse and buggy afforded the best means of transportation . . . when folks were obliged to pump and carry their own water, bake their own bread, and stoke the kitchen stove to heat the flatiron. Not the least of the hardships must have been the lot of the pharmacist, who found it necessary to make his own tinctures, fluid extracts, elixirs, and ointments and even to roll his own pills. The apothecary's art is as ancient as the pyramids, but pharmaceutical practice has been greatly simplified. The pharmacist now enjoys ready access to modern therapeutic agents through the service wholesaler of his choice.

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Iodine Tinctures

The following names become official in United States Pharmacopoeia XIII and National Formulary VIII:

1. Iodine Tincture U.S.P. XIII

[Official in U.S.P. XII as Mild Tincture of Iodine]

Formula

Iodine	20 Gm.
Sodium Iodide	24 Gm.
Diluted Alcohol, a sufficient quantity, To make	1000 cc.

2. Strong Iodine Tincture N.F.VIII

[Official in U.S.P. XII as Tincture of Iodine]

Formula

Iodine	70 Gm.
Potassium Iodide	50 Gm.
Distilled Water	50 cc.
Alcohol, a sufficient quantity, To make	1000 cc.

Please note that there are no changes in either formula, and, of course, no change in effectiveness; also that 'Iodine Tincture' is the same reliable 2% Iodine preparation for first aid treatment of cuts, scratches and minor abrasions.

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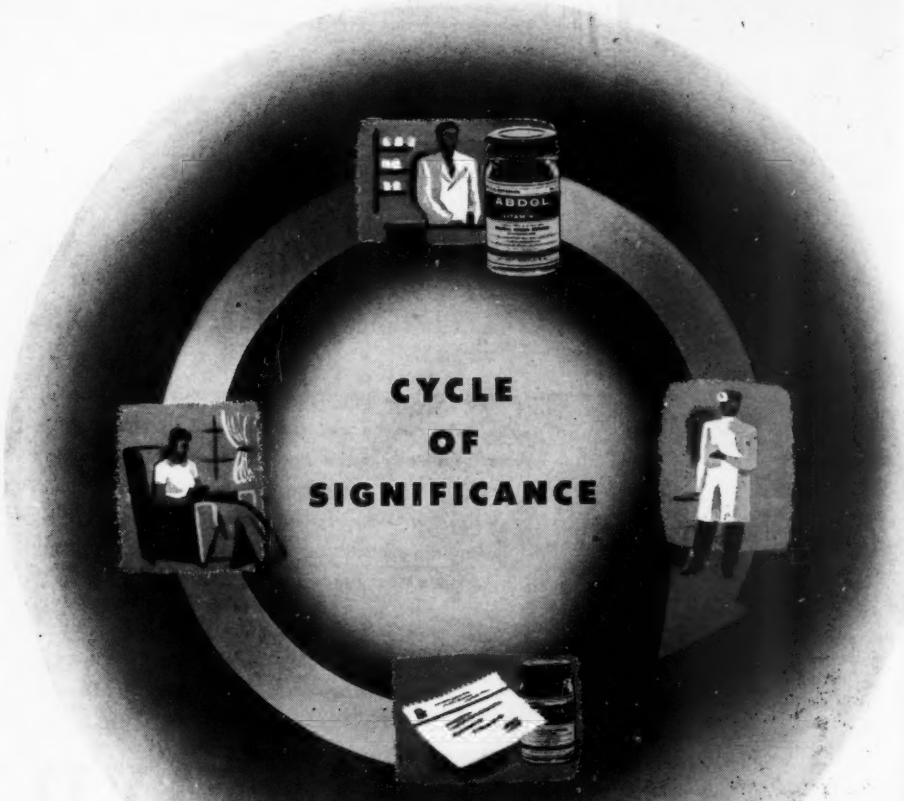

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Vitamin B_2 (G) (Riboflavin)	2.5 mg.
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Nicotinamide	20 mg.
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AND THE SCIENCES SUPPORTING PUBLIC HEALTH

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EDITORIAL

THE UNITED STATES PHARMACOPŒIA—AN ACCOMPLISHMENT

THIS issue of the *Journal* is devoted to a comprehensive article discussing each new monograph in the Thirteenth Revision of the Pharmacopœia of the United States of America which became official on April 1, 1947.

The system for drug standardization in the United States is without doubt one of our best examples of democracy at work and it is small wonder that our Pharmacopœia is acclaimed the world over—even to the point of its being accepted *in toto* by some of our sister republics as their own book of official standards.

There are those who see in the organization and administration of the Pharmacopœia a weakness and a looseness that they would remedy by more strict governmental control. It is ever thus with those who inwardly disbelieve in democratic procedure and whose devotion to the disciplines of regimentation is difficult to hide. Of course regimentation is, superficially at least, more efficient. Like a well-oiled machine, disciplined workers carry out their assigned tasks never criticizing nor trying to improve their work, leaving all such initiative to their superiors. But such lack of freedom soon debases man. He ceases to be a free and independent thinker, his mental processes become dulled and retrogression takes place.

The inefficiency of democracy, to those who believe in it, is more than repaid by what it does for the individual. A person working in such an environment feels a challenge to succeed and to do an even better job than his predecessor or his fellow-worker. His horizon is unlimited and his success and achievement determined solely by individual ability and effort.

The Pharmacopœia has countless critics and that is good, for out of such criticism progress is made. Many survey the list of *elected* Revision Committee members and question the wisdom of the delegates who elected them. Some comment caustically on the selec-

tion of its officers, complain bitterly of the decisions made, protest loudly about definitions, requirements, assays and so on *ad infinitum*. Is this not a perfect counterpart of our own treatment of Congress and our President? Of course it is and it is a very healthy sign. Who among us believes that Congress should be abandoned? By the same token we should understand that the Pharmacopœia cannot and should not escape criticism as long as those who criticize are willing to defend its democratic organization as they would that of the United States. Those, on the other hand, who see in its imperfections only a strong argument for governmental control make the same error of judgment that has led to the loss of freedom elsewhere in the world.

America today is one of the last bulwarks of democracy with its belief in the rights of the individual and the dignity of man. Let us be proud of our Pharmacopœia as a concrete example of voluntary achievement with each interested group working together with a common purpose. Above all we should cherish this privilege of self-government and insist that in no event shall the functions of the Pharmacopœia be replaced, even gradually, by any other agency or group not democratically conceived. The price we ourselves must pay for democracy and freedom is the willingness to see others have it and even the insistence on this point. This is a basic obligation which, if not met fairly and squarely, marks the first step in our own loss of freedom. Many are those who sadly remember how they acquiesced in the loss of freedom for others thinking themselves secure and in no danger. Tyranny, however, has an insatiable appetite and soon they too were victims of the same system.

No, our Pharmacopœia with all its slight imperfections is a worthy and valuable enterprise and our compliments go to those responsible for its program. Pharmacists and Physicians can point to it as a concrete example of technical progress and democratic action, the two things that make and keep America great.

L. F. Tice.

THE NEW DRUGS IN THE U. S. P. XIII

By L. F. Tice*

THE thirteenth revision of the United States Pharmacopœia became official in the United States on April 1, 1947. The new Pharmacopœia has included a long list of new monographs; some for drugs newly developed and proven therapeutically useful, others for drugs formerly recognized in the National Formulary. Still other monographs represent an acceptable dosage form for drugs previously recognized but for which no dosage form had been adopted. There is, of course, a group of products recognized as "pharmaceutical necessities" in that they are needed in the preparation of U. S. P. products. It is the policy of the Pharmacopœia to recognize, in monograph form, all ingredients of U. S. P. preparations since otherwise variations in the finished product might result from using unstandardized components.

The Pharmacopœia in adopting an official name for a drug does so by the use of a non-proprietary title, even though the drug may not be available except under a proprietary name. In this article the author has attempted to provide the pharmacist and physician with a correlation of proprietary names and U. S. P. titles and also to discuss briefly the properties and uses of the newly recognized drugs and preparations. Where drugs have been in use for a long time, or if they were formerly recognized in the National Formulary, only a brief statement is made.

Aluminum Phosphate Gel

This is an aqueous suspension containing 3.8-4.5 per cent of $AlPO_4$. It is permitted to contain certain flavors, sweetening agents and sodium benzoate (0.5%) as a preservative. This product is a white, viscous suspension from which small amounts of water may separate on standing. It is used as a gastric antacid similar to Aluminum Hydroxide Gel. The acid neutralizing power is not as great as that of aluminum hydroxide but it is sometimes preferred because it does not interfere with the assimilation of phosphates from the intestine. The dose is 8 cc. and Wyeth, Inc. market this product as Phosphaljel.

* Assistant Dean and Director of the Pharmacy Department, Philadelphia College of Pharmacy and Science.

Aminopyrine Tablets

These tablets simply represent a dosage form for a drug long official in the Pharmacopœia. Aminopyrine is a very effective analgesic and antipyretic. It has the one disadvantage of occasionally causing agranulocytosis when used over a period of time. The usual dosage is 0.3 Gm. The Winthrop Chemical Company supplies this drug under the name *Pyramidon.*

Anhydrohydroxyprogesterone
Anhydrohydroxyprogesterone Tablets

This drug chemically is pregneninolon. It represents an orally effective substance having the action of the corpus luteum and it is primarily responsible for the development of the secretory phase of the menstrual cycle and for the maintenance of pregnancy. It is used in certain irregularities of the menstrual cycle, sometimes combined with estrogens. It is useful in some cases of painful menstruation wherein it seems to inhibit uterine motility. The most frequent application of this drug and others having the effect of corpus luteum hormone is in the prevention of abortion or miscarriage where hormonal insufficiency is the causative factor.

Anhydrohydroxyprogesterone is sold under the following proprietary names:

Pranone—Schering Corp.

Lutocylol—Ciba.

Progestoral—Roche Organon.

The oral dose is 10 mg.

Anticoagulant Acid Citrate Dextrose Solution (A.C.D. Solution)

A solution containing in each 100 cc. 2.0-2.4 Gm. of sodium citrate, 0.75-0.85 Gm. of citric acid and 2.3 to 2.6 Gm. of dextrose. It is sterile and pyrogen-free and is used in the preparation of whole blood and plasma for indirect transfusion. It is also used in collecting blood which is to be centrifuged in the preparation of plasma. The presence of the small amount of citric acid and the dextrose prolongs the life of the cells until the blood can be transfused or centrifuged.

Antimony Sodium Thioglycollate
Antimony Sodium Thioglycollate Injection

This drug is a pink or white powder with a faint odor. It is discolored by light and should be stored in tight light-resistant containers. It is used in aqueous solution (in water for injection) and containing sodium citrate and thioglycollic acid as preservatives. Antimony Sodium Thioglycollate is used in the treatment of certain protozoal infections, e. g., granuloma venereum, kala azar and trypanosomiasis. The dose is 50 mg. given intramuscularly or intravenously every 2-4 days. It is sold by Hynson, Westcott and Dunning both as powder and in ampuls as a solution for injection (0.5 per cent).

Apomorphine Hydrochloride Tablets

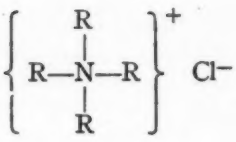
This is a dosage form for apomorphine hydrochloride which has been used for many years. The tablets usually supplied are hypodermic tablets which are dissolved in a small quantity of water for injection prior to use. When injected as an emetic the dose is 5 mg. subcutaneously.

Bentonite Magma

Bentonite Magma was recognized in the N. F. VII. Bentonite is a native, colloidal, hydrated aluminum silicate, i. e. a clay. It was named Bentonite because original deposits were obtained in the Fort Benton formation of the Upper Cretaceous of Wyoming. Bentonite has been defined by the U. S. Geological Survey as "a transported stratified clay formed by the alteration of volcanic ash shortly after deposition." It is used pharmaceutically to make the magma which in turn is used as a suspending agent, e. g. in Calamine Lotion. In some products it is superior to gums as a suspending agent.

Benzalkonium Chloride
Benzalkonium Chloride Solution

This is chemically a mixture of alkyl dimethyl-benzyl ammonium chlorides and it is one of the newer antiseptics known as the cationic type. Chemically it is a quaternary ammonium salt having the type formula



From this formula it will be seen that the active ion bears a positive charge and thus the name cationic (cathode seeking). It is employed in various concentrations as a bactericide and as a fungicide. Solutions of Benzalkonium Chloride have a very low surface tension due to the fact that this substance lowers interfacial tension. Solutions, therefore, foam or froth on shaking. Since it bears a positive charge the benzalkonium ion is incompatible with anionic wetting agents including soap, which therefore should not be used with it or prior to its use for the disinfection of the skin.

The following strengths are employed for the various purposes listed:

disinfection of skin	1:1,000
wet dressings	1:10,000-1:5,000
irrigation of eye, ear, nose and throat	1:10,000-1:5,000
sterile storage of instruments	1:5,000-1:1,000

(to prevent rusting 2 Gm. of sodium nitrite and 5 Gm. of sodium carbonate should be added to each liter of solution.)

Benzalkonium Chloride is sold as a solution under the proprietary name of *Zephiran Chloride* by the Winthrop Chemical Co.

Benzyl Benzoate
Benzyl Benzoate Lotion
Benzyl Benzoate, Saponated

Benzyl Benzoate is the benzyl ester of benzoic acid. It is a clear, colorless, oily liquid having a slight aromatic odor. Although it is sometimes used internally, the new Pharmacopœia recognizes it for the treatment of scabies and pediculosis. Benzyl Benzoate Lotion is a 25 per cent emulsion in a triethanolamine oleate base. It is employed in scabies by having the patient take a hot bath and then applying the lotion over the entire body from head to foot and allowing it to dry.

Saponated Benzyl Benzoate is a concentrate which, when diluted with three parts of water and shaken, gives the finished lotion.

These products were found very effective by the Armed Forces in the treatment of scabies.

Calamine
Calamine Lotion

These products were both recognized in the N. F. VII. Calamine owes its therapeutic virtues as a mild astringent and protective to zinc oxide, which is its principal constituent. Its superiority over zinc oxide is only due to its flesh-like color. The Lotion is an aqueous suspension stabilized with Bentonite Magma.

Calcium Phosphate, Dibasic

This calcium salt, also known as dicalcium orthophosphate and D. C. P., has the formula $CaHPO_4.2H_2O$. It is a white, odorless, tasteless, almost insoluble powder. It is used orally as a means of supplementing dietary calcium in those cases where an increase in the calcium supply is indicated, e. g., the treatment of mild rickets, as a prophylactic measure for rapidly growing children, and during pregnancy and lactation. The administration of vitamin D as an adjunct is quite common. Dicalcium phosphate is claimed to be superior to other calcium salts since it provides a favorable calcium-phosphorus ratio. It has been fairly well established that the utilization of calcium by the body is dependent upon both vitamin D and an adequate phosphorus supply. The dose of Dibasic Calcium Phosphate is 1 Gm.

Carbachol
Carbachol Injection
Carbachol Tablets

This drug is chemically carbamylcholine chloride having the formula $NH_2CO.O.CH_2.CH_2.N(CH_3)_3Cl$. It is a white or faintly yellow crystalline substance, odorless and hygroscopic. It is quite soluble in water, giving a neutral solution.

An understanding of the pharmacology of this drug involves a knowledge of the parasympathetic nervous system. These nerves, also known as cholinergic, are believed to produce stimulation of the receptor muscles through the mediation of acetylcholine at the

nerve endings. The administration of acetylcholine as a stimulant to the parasympathetic nervous system produces a transient effect since it is not stable in body tissues, being rapidly hydrolyzed by esterases. Carbachol is much more stable than either acetylcholine or acetyl-β-methylcholine (Methacholine U. S. P.) and, consequently, it can be given both orally and by subcutaneous injection as a parasympathetic stimulant. It is used clinically in the relief of postoperative urinary retention and abdominal distention, for the relief of acute pain due to vasospasm in peripheral vascular disease, and for the treatment of paroxysmal tachycardia. Overdosage may cause serious toxic results and patients vary in their response to its use. The average dose is 0.25 mg. subcutaneously.

Carbachol is also used in a concentration of 1.5 per cent in solution and in an ophthalmic ointment by the ophthalmologist for the treatment of glaucoma to relieve intraocular tension.

Carbachol is sold by Merck and Company as *Doryl* in the form of 2 mg. tablets for oral use and ampuls (1 cc. containing 0.25 mg.). For ophthalmic use the drug is sold under the name *Carcholin* in powder form in bottles containing 0.5 Gm.

Cholera Vaccine

This is a sterile suspension of killed cholera vibrios (*Vibrio comma*), of strains selected for high antigenic efficiency, in isotonic sodium chloride solution or other suitable diluent. Each cc. contains at least 8,000 million organisms.

Cholera Vaccine is used for active immunization against cholera. It is given hypodermically with an initial dose of 0.5 cc. followed in 7-10 days with 1.0 cc., the latter dose repeated once after a similar time interval. The product should be stored between 2° and 10° C.

Cholesterol

Cholesterol, also known as cholesterin, is a sterol which occurs in many animal fats and also both free and combined as esters in wool fat. It is a white or faintly yellow, almost odorless substance having a pearly luster and prepared in leaflet or granular form. Light or high temperature causes it to become discolored. It is insoluble in water but soluble in chloroform, petroleum, benzin, ether and fixed oils. Cholesterol and its esters have the capacity of absorbing water, forming water-in-oil emulsions and it is these components

which give wool fat this property. The Pharmacopœia recognizes Cholesterol as an ingredient of Hydrophilic Petrolatum which owes its hydrophilic or water-absorbing properties to the ingredients stearyl alcohol and wool fat as well as Cholesterol.

Coal Tar
Coal Tar Ointment

Coal Tar and Coal Tar Ointment were both official in the N. F. VII. The new Pharmacopœia now recognizes them. The U. S. P. XIII ointment is practically identical with that in the N. F. VII. Coal Tar Ointment is used for its antiseptic and stimulating effect in dermatology.

Corn Oil

This is a refined, fixed oil obtained by expression from the embryo or germ of *Zea Mays*. It is a clear, light yellow, oily liquid with a faint, characteristic odor and taste. Corn oil is recognized officially as a pharmaceutical necessity since it is one of the oils that may be used in the preparation of Medicinal Soft Soap.

Cupric Citrate
Cupric Citrate Ointment

Cupric Citrate is a green or bluish-green, finely crystalline, odorless powder. It is prepared in an 8 per cent ophthalmic ointment base containing wool fat, liquid petrolatum and white petrolatum, and used in the treatment of conjunctivitis, particularly in trachoma.

Desoxycorticosterone Acetate

This is the acetate of 11-desoxycorticosterone, one of the hormones of the adrenal cortex. It is made synthetically and it is a white, crystalline, odorless powder, insoluble in water but somewhat soluble in oils. It is used in various shock states, such as those resulting from burns, to help establish the electrolyte and water balance of the blood, and to exert a sparing effect on the adrenal cortex. It is also employed in Addison's disease, although it does not completely take the place of adrenal cortical extracts, since the latter contain other principles. Some success has attended its use following debilitating diseases as a means of hastening convalescence.

The dose by intramuscular injection in oil is 5-10 mg. daily. Pellets (75 mg.) are used by tissue implantation and a solution (10

mg./cc.) in propylene glycol and alcohol is used sublingually in 0.1 cc. doses repeated to provide the required daily dose. Oil solutions for intramuscular injection are sold under the following names:

Doca—Roche-Organon.

Percorten—Ciba Pharmaceutical Specialties Co.

Cortate—Schering Corp.

A solution for sublingual use is sold by Schering as *Cortate, Sublingual.*

Digitoxin
Digitoxin Injection
Digitoxin Tablets

Digitoxin is described in the Pharmacopœia as either pure digitoxin ($C_{41}H_{64}O_{13}$) or a mixture of cardioactive glycosides obtained from *Digitalis purpurea* and consisting chiefly of digitoxin.

Several products meet the requirements of the U. S. P. XIII monograph for Digitoxin. One, *Digitaline Nativelle,* of French origin, is reported to have an M. L. D. of about 0.42 mg./Kg., using cats. Other products, produced in large quantities in the United States have an M. L. D. found in different tests to range between 0.32 and 0.47 mg./Kg. From the pharmacologic standpoint these products show little if any difference. The therapeutic superiority of Digitoxin over digitalis and its preparations has led many authorities to predict that, in time, Digitoxin will completely displace digitalis in general use. Its superiority lies in the fact that it is a pure principle and it is absorbed so completely from the gastrointestinal tract that its oral and parenteral doses are identical. Digitalis leaf and tincture have the well-known disadvantage of being poorly absorbed from the gastrointestinal tract. It has never been possible to predict accurately the effectiveness when given orally since in its biologic assay the drug is injected intravenously. Digitoxin eliminates this uncertainty, it permits rapid digitalization of the patient, and its rapid absorption prevents much of the nausea and vomiting frequently encountered with digitalis *per se*. Digitoxin has approximately 1000 times the potency of digitalis, i. e. - mg. = 1 Gm. The initial digitalizing dose is 1.2 mg. followed by a daily maintenance dose of 0.2 mg. or according to the patient's needs. It is sold both as tablets and as an injection. In preparing solutions for injection it is dissolved in 40-

50 per cent alcohol with small amounts of glycerin. Digitoxin is sold under the following proprietary names:

Purodigin—Wyeth, Inc.

Crystodigin—Eli Lilly and Company.

Cardigin—National Drug Co.

Digitaline Nativelle is sold by the Varick Pharmacal Company, Inc. (a division of E. Fougera and Company, Inc.).

Digoxin
Digoxin Injection
Digoxin Tablets

Digoxin is a glycoside, obtained from the leaves of *Digitalis lanata.* It is a colorless, crystalline substance or a white, crystalline powder, odorless and insoluble in water but soluble in dilute alcohol.

Chemically Digoxin is related to Lanatoside C (also newly recognized in the U. S. P. XIII). It differs in being de-acetylated and in having a glucose residue removed by hydrolysis. It is used for digitalis therapy having similar advantages to those possessed by digitoxin over digitalis in that it is a pure principle. The oral dose is 1-2 mg. for digitalization followed by 0.25-0.50 mg. daily for maintenance. The intravenous dose for digitalizing the patient is 1.5 mg. followed by 0.25-0.50 mg. daily as a maintenance dose. It is sold by Burroughs Wellcome and Company.

Diphtheria and Tetanus Toxoids

This is a clear or slightly turbid, yellowish or brownish liquid made by mixing suitable quantities of diphtheria toxoid and tetanus toxoid, each of which possesses adequate potency to permit combining. The toxoids are mixed in such proportions that each cc. or less will contain one individual human dose of each of the active ingredients. This product is used particularly in children for joint active immunization against both diphtheria and tetanus. Since immunization against diphtheria is so universally employed it is now considered highly desirable to immunize the child against tetanus at the same time. Tetanus in children due to puncture wounds, etc., is far too common and hazardous considering the fact that immunization can be obtained at the same time that protection against diphtheria is acquired. The dose is 1 cc. to be repeated twice with intervals of

approximately three weeks between injections. If a subsequent Schick test is positive further doses must be given.

Diphtheria and Tetanus Toxoids, Alum Precipitated

This is a product similar to the above except that the toxoids are precipitated by alum and then suspended in saline solution. Only two injections of 1 cc. are usually necessary (4-6 weeks apart) and some physicians prefer this product to the plain toxoid since it contains less foreign protein from the serum from which it is obtained. It also provides a more lasting antigenic response inasmuch as it is injected as a suspension producing a depot from whence it is more slowly released.

Ethylenediamine Solution

An aqueous solution of ethylenediamine containing 67-71 per cent of $H_2N.CH_2.CH_2.NH_2$. It is a clear, colorless or slightly yellow liquid having an ammonia-like odor and a strong alkaline reaction. This product is used in the preparation of Aminophylline Injection U. S. P. XIII in which it may be added as a stabilizer in specified amounts with official sanction.

Gas Gangrene Antitoxin, Bivalent
Gas Gangrene Antitoxin, Pentavalent
Gas Gangrene Antitoxin, Trivalent

These antitoxins are used both as prophylactics and in the treatment of gas gangrene. They are sterile solutions of antitoxic substances prepared in much the same way as diphtheria antitoxin, being obtained from the blood of animals immunized against certain of the organisms involved in gas gangrene.

The Bivalent type contains antitoxins prepared from the blood of healthy animals which have been immunized against the organisms *Clostridium perfringens* and *Clostridium septicum.* The Trivalent includes *Clostridium oldematiens* and the Pentavalent the three already named plus *Clostridium bifermentans* and *Clostridium histolyticum.* In each of the three products there is a minimum requirement of antitoxic potency. All three are directed to be stored at a temperature between 2° and 10° preferably at the lower limit.

Helium

This is an inert gas in which the U. S. P. permits the presence of not more than 5 per cent nitrogen. It is colorless, odorless and

tasteless. The medicinal uses of Helium depend entirely on its inertness together with its very low density. When used as a diluent for oxygen in place of nitrogen (as in air) the mixture is much more easily breathed by an asthmatic. Thus a mixture of 80 per cent Helium and 20 per cent oxygen weighs only one-third as much as air and requires only one-half the physical pressure for movement through a tube. In cases where the bronchi are constricted, such as asthma, less effort is required in breathing and the mixture flows more freely into the lungs relieving the labored respiration and anoxia in the patient. The gas is also practically insoluble in the body fluids, a property which makes it the most suitable carrier for the oxygen supplied to divers, since the period of decompression required for the prevention of "caisson disease" is greatly reduced.

Hexylresorcinol Pills

These represent an acceptable dosage form for the administration of hexylresorcinol as an anthelmintic. Hexylresorcinol is probably the anthelmintic of choice in the eradication of roundworms (*Ascaris lumbricoides*). It is also fairly effective in the treatment of infestations of pin worms (*Enterobius Vermicularis*) and dwarf tapeworms (*Hymenolepis nana*). The pills are required to be coated with a tough gelatin coating in order to guard against burns in the mouth in case they are chewed. The average adult dose is 1 Gm. taken preferably on an empty stomach in the morning following a light evening meal. Food is withheld for 4-5 hours and a saline purge or an enema employed to help in the removal of the dead worms. In some cases two or three treatments at three-day intervals may be required. Sharp and Dohme market Hexylresorcinol Pills under the proprietary name *Crystoids Anthelmintic* in two sizes, one for young children and the other for adults.

Hydrophilic Ointment

This is a companion product of Hydrophilic Petrolatum U. S. P. XIII developed as a superior type of base for the incorporation of various drugs. It contains sodium lauryl sulfate, stearyl alcohol, white petrolatum, glycerin and water with methylparaben and propylparaben as preservatives. It is an emulsion base of the type commonly described as a "washable ointment base" and in many instances it is preferable to the older fatty or hydrocarbon bases. Such an

ointment permits better release of drugs and antiseptics to the tissues, it is less sensitive to temperature change and it is easily removed from the skin, clothing or bed linens with water.

Hydrophilic Petrolatum

This is a base consisting of: cholesterol, 1 per cent; stearyl alcohol, 3 per cent; white wax, 8 per cent; wool fat, 15 per cent and white petrolatum, 73 per cent. It is far superior to white petrolatum alone as an ointment base and it was developed after extensive research by the U. S. P. Subcommittee on Ointments and Miscellaneous Galenicals. Although it is anhydrous it readily absorbs water or aqueous solutions.

Insulin, Protamine Zinc, Injection

This product has been in use for several years as a means of prolonging the action of insulin. It was originally introduced by Hagedorn in 1936. It is an aqueous suspension of insulin modified by the addition of protamine and zinc chloride at a pH level between 7.1 and 7.4. At this pH the negatively charged insulin (I. P. 5.6) reacts with the positively charged protamine (I. P. 8.0). The precipitate is made still further insoluble by the presence of the small amount of zinc. The product is packaged in 10 cc. vials containing 40 units/cc. and 80 units/cc. The container must be carefully shaken to obtain a uniform suspension before withdrawing each dose. Protamine Zinc Insulin Injection is given intramuscularly either alone or mixed with regular insulin injection according to the established individual needs of the diabetic patient. It is marketed by Eli Lilly and Company, E. R. Squibb and Sons, and Sharp and Dohme, Inc.

Iodopyracet Injection

This is a sterile solution of the diethanolamine salt of 3,5-diiodo-4-pyridone-N-acetic acid in water for injection, containing in each 100 cc. 34-36 Gm. of the salt. It is a clear, nearly colorless liquid and neutral to litmus paper.

This compound contains approximately 49.8 per cent of iodine and it is useful as a contrast medium in intravenous urography. It is administered into the cubital veins in a dosage of 20 cc. (adults) previously warmed to body temperature. Roentgenograms are taken

at 5, 15 and 45 minute intervals. Some transient side-effects may take place, such as flushing, nausea and skin eruption. The latter may require a few days to subside. The drug is contraindicated in severe liver disease, nephritis, and uremia and appropriate tests should rule these out before its use. Winthrop Chemical Company sells this product under the name *Diodrast Sterile Solution.* It should not be confused with two other similar Winthrop products which are not used for the same purpose, namely:

Diodrast Compound Solution.
Diodrast Concentrated Solution.

Lanatocide C
Lanatocide C Injection
Lanatocide C Tablets

Lanatocide C is a glycoside obtained from the leaves of *Digitalis lanata.* It is a colorless, crystalline substance or a white crystalline powder soluble only to the extent of one gram in 20,000 cc. of water. It is soluble in alcohol to the extent of 1 gram in 45 cc. and the injection is prepared using 70 per cent alcohol as the solvent. Chemically, Lanatocide C is closely related to Digoxin. It is used for digitalis therapy and has the advantage over digitalis of being a pure principle. The oral dose given by the Pharmacopœia is 0.5 mg. but a carefully graduated and controlled dosage schedule is indicated with this drug as with Digitoxin and Digoxin to first "digitalize" the patient and then place him on a proper maintenance dose. Sandoz Chemical Company markets this product in both tablet and ampul form as *Cedilanid.*

Liver with Stomach

This is a brownish powder resulting from mixing a concentrated aqueous extract of mammalian liver with minced fresh hog stomach tissue, incubating the mixture, drying under reduced pressure and defatting. The product is used orally in the treatment of pernicious and other macrocytic anemias and it has been demonstrated that, by the interaction of stomach tissue and liver extract, a potentiation of the anti-anemia effect is produced. Heat destroys that part of the activity not identified with the liver extract itself. The potency is expressed in terms of U. S. P. Oral Units and the preparation is used only by the oral route. Eli Lilly and Company market this product under the name *Extralin.*

Methacholine Chloride
Methacholine Chloride Capsules
Methacholine Chloride Injection

This drug is also known as acetylmethylcholine chloride. Its formula is $CH_3CO.OCH(CH_3)CH_2(CH_3)_3N.Cl$. It is a colorless or white crystalline substance or powder, odorless or nearly so, and very deliquescent. It is very soluble in water giving a neutral solution. In the body it acts as a parasympathetic stimulant similar to acetylcholine over which it has the advantage of being more prolonged in its effect. By its effect at the neuromuscular junction of the parasympathetic nerves it stimulates their contraction. It is therefore useful therapeutically in paroxysmal auricular tachycardia, for the relief of acute pain due to vasospasm in peripheral vascular disease, in the treatment of indolent and gangrenous ulcers occurring in peripheral vascular disease, and in the relief of abdominal distention and urinary retention following surgery. Methacholine is similar in its pharmacologic activity to Carbachol except the latter is more persistent in its action. Methacholine is given orally in doses of 0.2-0.5 Gm., by subcutaneous injection using 10-40 mg., and by iontophoresis where its local effect is desired. Merck and Company market Methacholine under the proprietary name *Mecholyl.*

Methylparaben

Methylparaben chemically is methyl parahydroxybenzoate. It is a colorless, crystalline powder with a faint, characteristic odor and a slight burning taste. This, the methyl ester of parahydroxybenzoic acid, together with the propyl, butyl and other esters are widely used as preservatives in pharmaceuticals. It is superior to sodium benzoate but like the latter has certain limitations. The concentration needed varies with the product in which it is employed. Thus 0.05-0.5 per cent is used. The presence of oils, e. g. in emulsions, makes a higher concentration necessary than would be needed in a simple aqueous solution. This is due to the partition coefficient favoring the oil phase. Combinations of two esters, e. g. the methyl and propyl, are more effective as preservatives than either one alone. The Pharmacopœia uses both Methylparaben and Propylparaben (also U. S. P. XIII) in Hydrophilic Ointment as preservatives. Methylparaben is sold under a variety of trade names including *Tegosept M,*

Goldschmidt Chemical Corporation and *Methyl Parasept,* Heyden Chemical Company.

Methyltestosterone
Methyltestosterone Tablets

Methyltestosterone is a white or slightly yellow crystalline substance or powder. Testosterone, the male sex hormone, is poorly absorbed when given orally but the methyl derivative is effective by mouth, sublingually, or by inunction. It is used in those cases where androgen deficiency exists and stimulation therapy is ineffective or inadequate. It is also employed to combat excessive estrogen or to suppress excessive pituitary activity in females. In clinical practice considerable success has followed its use in males for hypogonadism, involutional melancholia and hypertrophy of the prostate. In females it is useful in treating those conditions associated with excessive estrogen and in the control of excessive lactation.

Methyltestosterone in tablet form is given in doses of 10 mg. three to five times daily. Sublingually, the dose is 5 mg. It is sold under a variety of proprietary names including *Oreton M Tablets*—Schering Corporation, *Neo-Hombreol M Tablets*—Roche Organon, and *Metandren Tablets*—Ciba Pharmaceutical Specialties Company.

Morphine Injection

This is simply a new dosage form for morphine in the Pharmacopœia. The morphine salt to be employed in preparing the injection is not specified but the one used must be stated on the label. It is, of course, a sterile solution prepared with water for injection. The average dose of morphine when injected is 10 mg.

Nicotinamide Injection

This is a new dosage form of nicotinamide which itself was recognized in the U. S. P. XII. It is a sterile solution of nicotinamide in water for injection. Nicotinamide, also known as niacinamide, is one of the vitamin B-complex factors. It is preferred by most clinicians for injection rather than nicotinic acid since it produces less side-reactions, such as flushing. It is used in treating pellagra and other B-complex deficiency states either alone or in conjunction with the other B factors, e. g. riboflavin and thiamine. The average dose of nicotinamide parenterally is 100 mg.

Papaverine Hydrochloride
Papaverine Hydrochloride Injection

Papaverine is an alkaloid obtained from opium and also prepared synthetically. It was official in the Seventh Edition of the National Formulary but it was judged to be of sufficient therapeutic worth to gain recognition in the new Pharmacopœia. Papaverine Hydrochloride is a white crystalline substance and soluble in water. It is a non-narcotic alkaloid producing neither sleep nor analgesia. It relaxes smooth muscles of the body such as the bronchi, the intestine, the ureters and the blood vessels, although not all are equally affected. Papaverine is used in the treatment of gastric and intestinal spasm, in biliary colic and bronchial spasm. Many practitioners consider it useful in angina pectoris and in the treatment of peripheral or pulmonary embolism. In the case of embolism, circulation is increased collaterally in a vascular bed which otherwise would be constricted by reflex action.

The average dose of Papaverine Hydrochloride both orally and intravenously is 0.1 Gm.

Peanut Oil (Arachis Oil)

This is a fixed oil obtained by cold expression from the peeled seeds of cultivated varieties of *Arachis hypogæa*. It is pale yellow in color, with a bland nutty taste.

Peanut oil is recognized as a vehicle for drugs to be administered in oil solution or suspension by intramuscular injection. Thus it is employed as the vehicle for Penicillin Injection in Oil and Wax. Peanut Oil and Sesame Oil are the two oils best suited for intramuscular injection.

Penicillin Calcium

This is the calcium salt of the antibiotic substance or substances produced by the growth of *Penicillium notatum* Westling or of *Penicillium chrysogenum* Thom.

It is a white to brown powder, granules or scales and it has a slight characteristic odor. When highly purified it does not absorb moisture appreciably but most samples are somewhat hygroscopic. Penicillin Calcium is fairly stable when dry but in solution it deteriorates rapidly, the rate depending upon the temperature. Acids, oxidizing agents and heavy metals inactivate it.

The strength of Penicillin Calcium in terms of units/mg. is variable, ranging from 300 to over 1000 units/mg. (The unit is the activity contained in 0.6 microgram of the Penicillin Master Standard which in turn is practically identical with the International Standard.)

Penicillin Calcium is the form of penicillin preferred for the preparation of dosage forms such as tablets, ointments, troches, etc. It may also be used in solution for intramuscular injection.

Penicillin Sodium

The sodium salt of penicillin is quite analogous to the calcium salt except that it is considered to be less suitable for use in the manufacture of dosage forms. Commercial samples are usually more hygroscopic than the calcium salt. Penicillin Sodium is used chiefly for intramuscular injection.

Penicillin Dental Cones

These are composed of penicillin calcium with the necessary diluents, binders and lubricants. Sulfanilamide and/or sulfathiazole, are also permitted to be included. The cones usually contain 1000 or 5000 units each of penicillin and when sulfanilamide is added it is used in an amount of 30 mg. or 60 mg. for each cone.

Penicillin Dental Cones are used in the treatment of socket infections following extraction, being inserted by the dentist into the socket cavity.

Penicillin Injection in Oil and Wax

Based on an original formula described by Romansky, this is a sterile suspension of Penicillin Calcium in a menstruum of peanut oil or sesame oil, in which white wax is dispersed. Marketed products contain either 100,000, 200,000 or 300,000 units of penicillin per cc. This product when injected intramuscularly provides a depot from which penicillin is gradually released thus eliminating the necessity of frequent injections. An injection of 300,000 units of penicillin in this form provides effective blood levels for twenty-four hours, although for severe infections two such injections each day, twelve hours apart, may be needed.

Injection is made using a dry, warm syringe fitted with an 18-gage needle, the ampul being warmed to body temperature before withdrawing the dose. The site of injection usually chosen is the

upper outer quadrant of the buttocks. It is important that the plunger of the syringe be drawn back slightly to make sure the needle is not in a blood vessel since injection into a vein is dangerous.

A number of companies supply this product, some in a disposable type of syringe or syringe cartridge as a convenience to the physician.

Penicillin Injection in Oil and Wax is sold under the proprietary name *Delacillin* by E. R. Squibb and Sons.

Penicillin Ointment

Penicillin Ointment contains Penicillin Calcium in a suitable ointment base. The usual strengths marketed contain 1000 units per Gm. At the present time anhydrous bases are used for Penicillin Ointment since the absence of water prolongs the "shelf life." Experiments have shown, however, that the diffusion of penicillin from anhydrous bases into an aqueous medium is poor compared with that from ointments containing water. From these experiments one might conclude that emulsion bases are better vehicles for penicillin in ointment form than the anhydrous bases if one is more interested in effectiveness than prolonged stability.

Penicillin Ointment should be stored at a temperature not exceeding 15° C.

Proprietary names for penicillin ointment include: *Topicillin Ointment,* E. R. Squibb and Sons, and *Ledercillin-G Ointment,* Lederle Laboratories, Inc.

Penicillin Tablets

These contain Penicillin Calcium or Penicillin Sodium with some buffer such as calcium carbonate, sodium citrate or aluminum hydroxide. The strength of the tablets as now marketed is 50,000 units each. The tablets must be stored in hermetically sealed or tight containers at a temperature not exceeding 15° C.

The oral use of penicillin is not as reliable as parenteral injection since one cannot predict with certainty the amount that will be destroyed or inactivated in the gastrointestinal tract. Gastric acidity is responsible for the major amount of that destroyed and thus the use of buffers in an effort to reduce gastric acidity. Since the free acidity of the stomach is at a minimum during its resting period, penicillin should be given orally as far from feeding time as possible.

When given on a fasting stomach even better results may be expected. Generally speaking, about five times as much penicillin must be given orally as intramuscularly to achieve the same blood levels. Some physicians resort to oral penicillin therapy after the initial emergency of infection has been controlled by parenteral administration. Penicillin Tablets should be given every 3-4 hours with a daily dose (24 hours) of at least 300,000 units.

Proprietary names for Penicillin Tablets include the following: *Penioral Tablets,* Wyeth, Inc.; *Per-Os-Cillin,* Hoffmann-LaRoche; *Ledercillin G Tablets,* Lederle Laboratories, Inc.; and *Gelu-Cillin,* William R. Warner and Company.

Penicillin Troches

These contain either Penicillin Calcium or Penicillin Sodium in a suitable base. Two types of troches are prepared. One is made using some soluble vehicle such as gelatin, agar or sugars. The second type is known as a "chewing troche" and its base is composed of wax. In the soluble type of troche or pastille the troche usually contains 1000 units of penicillin and it is allowed to dissolve slowly in the mouth, providing a release of penicillin for an effect in the mouth and throat. The chewing troche contains 20,000 units and it is chewed over a period of several hours like chewing gum. During this time it slowly releases penicillin.

In the case of the soluble type of troche the situation is similar to that described with ointments. The tendency is to prepare an anhydrous product in the interest of stability. Clinical reports, however, seem to favor the extemporaneous type prepared with gelatin since these, although stable only about one month, do not produce stomatitis. This soreness of the mouth is an occasional complaint of patients using troches made with certain gums and sugars in the anhydrous form.

Penicillin Troches of both types are quite useful in combatting mouth and throat infections due to penicillin-susceptible organisms, notably Vincent's angina.

Proprietary names for penicillin troches are:

Soluble Type: *Pen-Troches,* Cutter Laboratories; *Bucillin,* Wyeth, Inc.

Chewing Troches: *Topicillin Chewing Troches,* E. R. Squibb and Sons.

Plague Vaccine

This is a sterile suspension of killed plague bacilli (*Pasteurella pestis*), of a strain selected for high antigenic efficiency, in isotonic sodium chloride solution or other suitable diluent. Each cc. contains at least 2,000 million organisms. Plague, also known as bubonic plague, is transmitted by the bite of a flea which has become infected by feeding on rodents. The pneumonic form is transmitted from person to person by the inhalation of air contaminated by coughing. The vaccine is used hypodermically for active immunization. The dose is 0.5 cc. followed in 7-10 days with 1 cc., the latter dose repeated once.

Progesterone

This is a synthetic substance possessing the physiological effect of the corpus luteum hormone or progestin. It is a white crystalline powder, stable in air, insoluble in water but somewhat soluble in oils.

For the therapeutic uses of Progesterone see under *Anhydrohydroxyprogesterone* which is an orally active form. Progesterone itself is employed in oil solution by intramuscular injection. The dose is 5 mg. It is sold under the following proprietary names:

Proluton in Oil—Schering Corp.

Progestin in Oil—Roche-Organon.

Progestin in Oil—Abbott Laboratories.

Lutocylin in Oil—Ciba Pharmaceutical Specialties Co.

Nalutron in Oil—Winthrop Chemical Co.

Lutromone in Oil—Endo Products, Inc.

Lipo-Lutin—Parke Davis & Co.

Propylparaben

Propylparaben is propyl parahydroxybenzoate and it is used as a preservative for certain pharmaceutical preparations. These compounds were discussed under *Methylparaben,* the methyl ester.

Propylparaben is sold under a number of proprietary names including *Tegosept P,* Goldschmidt Chemical Corporation, and *Propyl Parasept,* Heyden Chemical Company.

Riboflavin Injection

Riboflavin Injection is a sterile solution of riboflavin in water for injection. It may contain nicotinamide, urea or other suitable

harmless solubilizing agents to increase the solubility of the riboflavin. Riboflavin is extremely sensitive to light and thus it must be stored in light-resistant containers. It is employed in those deficiency states attributable to a riboflavin shortage in the diet. Riboflavin is one of the B-complex factors essential in human nutrition. The minimum daily requirement is estimated to be 2 mg. but when used therapeutically much larger doses may be given.

Ringer's Solution, Lactated

This sterile solution, prepared in water for injection, contains in each 100 cc. the following:

18-22 mg. $CaCl_2.2H_2O$
27-33 mg. KCl
570-630 mg. NaCl
290-330 mg. $NaC_3H_5O_3$ (Sodium Lactate)

Lactated Ringer's Solution is used in much the same way as Isotonic Sodium Chloride Solution or Ringer's Solution for parenteral injection to correct dehydration and temporarily to replace circulating blood volume. It is superior to these other solutions in certain types of acidosis, inasmuch as the sodium lactate helps to maintain the buffer action of the blood.

The Pharmacopœia also permits the use of a concentrate to prepare this solution by dilution. A number of companies supply the solution under the name *Lactate Ringer's Solution.*

Sesame Oil

This is the fixed oil obtained from the seed of *Sesamum indicum.* It is a pale yellow liquid, almost odorless and has a bland taste. Sesame Oil is recognized officially as an oil suitable for use in preparing oleaginous intramuscular injections. It is, for example, specified with peanut oil as satisfactory for the preparation of *Penicillin Injection in Oil and Wax.*

Sodium Ascorbate Injection

This is a sterile solution of Sodium Ascorbate in water for injection. It is used by injection in those cases requiring vitamin C (ascorbic acid) therapy and is preferable to ascorbic acid for parenteral use. The average daily dose, calculated as ascorbic acid, is 0.1 Gm.

Sodium Lactate Injection

This is a sterile solution of sodium lactate ($NaC_3H_5O_3$) in water for injection. The usual strength prepared in 1.87 per cent or one-sixth molar since this concentration is isotonic with the blood. It is used in the treatment of acidosis either alone or in the form of Lactated Ringer's Solution. It is also employed in alkalinizing the urine, as for example in the use of sulfonamides in the treatment of acute infections of the urinary tract.

Sodium Lactate Injection is used either subcutaneously or intravenously. When given intravenously it should not be given at a rate greater than 300 cc. per hour. A number of companies sell this product as *Sodium r-Lactate One-Sixth Molar in Distilled Water.*

Sodium Lauryl Sulfate

This is defined officially as a mixture of sodium alkyl sulfates, consisting chiefly of sodium lauryl sulfate $CH_3(CH_2)_{10}CH_2OSO_3Na$. It is a white or light yellow crystalline material having a slight characteristic odor. It is soluble in water, giving an opalescent solution. This substance is widely used as a wetting agent. It is effective in neutral, slightly acid or alkaline solution and it belongs to that group known as anionic wetting agents. Sodium Lauryl Sulfate is superior to soap since it does not require a strongly alkaline medium and it is less sensitive to calcium and magnesium salts. The U. S. P. XIII recognizes this substance as an ingredient of Hydrophilic Ointment which is an official form of what is commonly described as a "washable ointment base," being easily removed with water.

Sodium Lauryl Sulfate is used in "soapless" shampoos, liquid dentifrices and brushless shaving creams and it is known under certain technical trade names in the detergent field.

Sodium Morrhuate Injection

This is a sterile solution of the sodium salts of the fatty acids of cod liver oil. A suitable preservative (not to exceed 0.5 per cent) and ethyl or benzyl alcohol (not to exceed 3 per cent) may be added. Sodium Morrhuate is generally used in a concentration of 5 per cent as a sclerosing solution for the obliteration of varicose veins. Precautions must be taken to test the patient against undue reaction to the drug and in establishing proper dosage and frequency of injections. A number of companies sell this product under its official title.

Stearyl Alcohol

This product is recognized since it is used in making Hydrophilic Ointment and Hydrophilic Petrolatum. It is a mixture of solid alcohols consisting chiefly of $CH_3(CH_2)_{16}CH_2OH$. Stearyl Alcohol is a white unctuous flaky or granular solid. Like cetyl alcohol (its lower homologue), Stearyl Alcohol confers on ointments and creams a smoothness of texture and a capacity for water as exemplified in the new product Hydrophilic Ointment U. S. P. XIII which contains 2.5 per cent of this alcohol. *Stenol* is a proprietary name for stearyl alcohol.

Sulfamerazine
Sulfamerazine Tablets
Sulfamerazine Sodium
Sulfamerazine Sodium, Sterile

Sulfamerazine chemically is *p*-amino-N-2-(4-methylpyrimidyl) benzenesulfonamide. It is closely related to sulfadiazine being its methyl derivative, i. e. sulfamethyldiazine. Physically it is a white or faintly yellow crystalline substance or powder and rather insoluble in water. Sulfamerazine slowly darkens on exposure to light. This compound is much more rapidly absorbed from the gastrointestinal tract than sulfadiazine and it is also much more slowly excreted. As a result, it need be given less frequently in order to maintain effective blood levels. Sulfamerazine penetrates into the cerebrospinal, pleural and peritoneal fluids and its concentration is usually about one-half that in the blood. Sulfamerazine in its acetylated form is more soluble in urine at pH 7 than sulfadiazine, and free sulfamerazine is more soluble than sulfadiazine in urine at any pH. As a consequence, renal toxicity is less likely with sulfamerazine than with sulfadiazine.

Sulfamerazine is used in the treatment of various coccic infections, e. g. pneumococcal, streptococcal, meningococcal and gonococcal. The dosage orally varies with age and body weight but the average adult dose is 3-4 Gm. initially followed by 1 Gm. every eight hours. Blood concentrations to be effective should be between 10 and 15 mg./100 cc.

For intravenous use the Sterile Sulfamerazine Sodium is employed. This is packaged as a rule in a dry ampul since the aqueous solution is unstable.

Suramin Sodium

This is also known as Naphuride and Bayer 205. It is a white or slightly pink, water-soluble powder which is both hygroscopic and affected by light. The compound is used by intravenous injection, usually dissolved in normal saline solution, in trypanosomiasis. It is particularly useful in African Sleeping Sickness as a prophylactic. Some toxic effects have been noted, especially on the kidney, and its administration to patients with renal insufficiency and albuminuria requires great caution. It is given intravenously in initial doses of 0.5 Gm. followed by 1.0 Gm. every other day for four doses. The powder should be sprinkled on water to prevent clumping. Suramin Sodium is sold by the Winthrop Chemical Company as *Naphuride Sodium.* It is also known as *Fourneau 309, Germanin, Nagonol* and *Moranyl.*

Surgical Sutures

This monograph covers those sutures *not* made of silk or the intestinal fibers of sheep since these are recognized as Surgical Silk and Surgical Gut respectively. Surgical Sutures are prepared from some suitable organic substance or metal and appropriate tests are given for their tensile strength, sterility, etc.

Testosterone Propionate

This is the propionic ester of testosterone which is used by intramuscular injection in oil solution. It is a white or slightly yellow crystalline powder stable in air. The average dose is 25 mg. It is sold in oil solution for injection under the following proprietary names:

Neo-Hombreol—Roche-Organon.

Oreton—Schering Corporation.

Perandren—Ciba Pharmaceutical Specialties Co.

Generally speaking, the intramuscular injection of testosterone in oil produces more reliable results than the oral use of methyltestosterone. Therapy may be best intiated by the injection route and then methyltestosterone, if desired, used to maintain therapy. For the clinical applications of androgen therapy see *Methyltestosterone.*

Tetanus and Gas Gangrene Antitoxins

This is a sterile solution of the antitoxic substances obtained from the blood of healthy animals which have been immunized against the toxins of *Cl. tetani, Cl. perfringens* and *Cl. septicum.* Each package (one minimum dose) contains not less than 1500 units of tetanus antitoxin and not less than 2000 units each of the other two. It is used as a prophylactic where contaminated wounds make either tetanus, gas gangrene or both infections a hazard.

Thiamine Hydrochloride Injection

This is a new official dosage form for thiamine or vitamin B_1. The dose is not specified since it is given by physicians in a wide range of dosage in accordance with their estimate of the patient's need. Thiamine is used not only in deficiency states but also as a drug in the treatment of certain other diseases. The use of thiamine in the latter is still somewhat experimental.

Thiopental Sodium
Thiopental Sodium, Sterile

Chemically this is sodium 5-ethyl-5(1-methylbutyl)-thiobarbiturate. Thiopental Sodium is a thiobarbiturate the formula of which is identical with that of Pentobarbital Sodium except that a sulfur replaces oxygen in the urea residue of its structure. It is a yellowish-white, hygroscopic powder with a disagreeable odor and an alkaline reaction.

The thiobarbiturates are very rapid in their effect and they are used intravenously for anesthesia. Sterile Thiopental Sodium is mixed with anhydrous sodium carbonate as a buffer and as such it is packaged in a dry ampul to be dissolved just prior to injection. It is useful only for operations of short duration and only those trained in its use should attempt the technique. Thiopental Sodium is sold by Abbott Laboratories as *Pentothal Sodium.*

Triethanolamine

This is a mixture consisting largely of triethanolamine $N(C_2H_4OH)_3$ with varying amounts of diethanolamine $NH(C_2H_4OH)_2$ and monoethanolamine $NH_2(C_2H_4OH)$. It is a colorless to pale yellow, viscous, hygroscopic liquid having a slight ammoniacal odor. It is completely miscible with water, giving an alkaline reaction.

Triethanolamine is used with fatty acids, such as oleic, to form soaps. These are excellent emulsifying agents and are superior to the alkali metal soaps in being less alkaline and irritating. Triethanolamine oleate is used as the emulsifying agent in Benzyl Benzoate Lotion U. S. P. XIII and in preparing the concentrate, Saponated Benzyl Benzoate.

Tuberculin, Purified Protein Derivative of

This, sometimes abbreviated as Tuberculin P. P. D., is a sterile soluble product of the growth of tubercle bacilli (*M. tuberculosis*) prepared in a special liquid medium free from protein.

It is an amorphous powder, soluble in water and usually supplied with suitable diluent in tablet form. This material is employed as a diagnostic aid in the tuberculin test for tuberculosis. Two strengths of the tablet are available; one containing 0.00002 mg. and the other 0.005 mg. A solution is prepared with the tablet just prior to its use. The test is an intradermal one, the stronger tablet being employed only if the weaker gives no response. A positive reaction is indicative of a focus but not necessarily active tuberculosis.

Typhus Vaccine, Epidemic

This vaccine is a sterile suspension of the killed rickettsial organism of a strain or strains of epidemic typhus rickettsiæ selected for antigenic efficiency. The organisms are cultured in the yolk sack membrane of chick embryos. This product is used for active immunization against epidemic typhus. The dose is 1.0 cc. hypodermically, repeated once or twice at 7-10 day intervals. A booster dose every six months should be used if continuing danger of infection is present. The product should be stored between 2° and 10° C.

Vinyl Ether

Chemically, Vinyl Ether is divinyl oxide $CH_2:CH.O.CH:CH_2$. The U. S. P. product contains about 4 per cent of dehydrated alcohol and 0.025 per cent of a preservative (phenyl-α-naphthylamine) is permitted. The dehydrated alcohol prevents its freezing on evaporation and the preservative its polymerization and decomposition. It is a clear liquid with a characteristic odor. The containers in which it is stored must not exceed 200 cc. in capacity and it must not be used if the original container has been opened longer than forty-eight hours.

Vinyl Ether is used as an inhalation anesthetic for short anesthesias. It is very rapid in its action and recovery is likewise rapid. Care must be taken, however, in its use not to go beyond surgical anesthesia into dangerous overdosage. For any but the shortest of procedures, continuous administration is necessary in order to maintain anesthesia. The open drop method of administration is probably the best method for using it. Merck and Company supply Vinyl Ether for anesthesia as *Vinethene.*

Yellow Fever Vaccine

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The vaccine must be stored in the dry condition in the unopened container preferably below 0° C. and never above 5° C.

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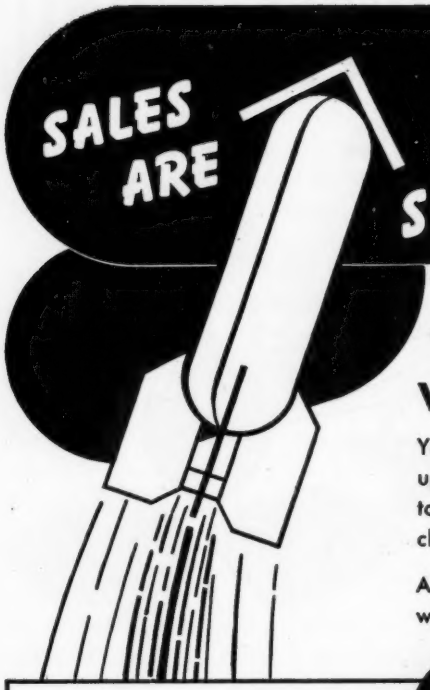

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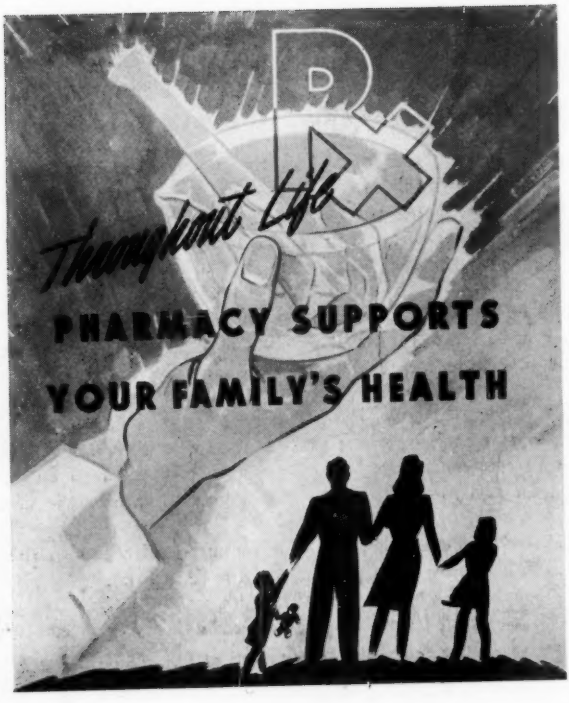
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